

## **ELECTRICAL NOTES per 2016 California Electrical Code**

### **A. PANEL LOCATIONS**

Panels shall not be located in the vicinity of easily ignitable material, such as clothes closets, or in bathrooms [CEC 240-24(D)].

### **B. NON-METALLIC SHEATHED CABLE [CEC 334]**

Non-metallic sheathed cable shall be:

1. Protected by rigid metal conduit, intermediate metal conduit, electrical metallic tubing, schedule 80 PVC conduit, pipe, or other means when cable is exposed or subject to physical damage. [CEC 334.15(B)]
2. Protected by a 1/16-inch steel plate or sleeve or be not less than 1-1/4 inch from the nearest edge of the framing member, when installed through framing members. Steel plates or sleeves are required on all double shear walls when cable is installed either through or parallel to framing members [CEC 334.17].
3. Protected by guard strips within 6 feet of an attic access when no permanent stairs or ladders are provided [CEC 334.23, 320.23].
4. Protected by guard strips in the entire attic when permanent stairs or ladders are provided. Access panels or doors from the second floor into the attic are considered permanent access and guard strips are required in the entire attic.
5. Have a bending radius not less than 5 times the diameter of the cable [CEC 334.24].
6. Supported at intervals not exceeding 4-1/2 feet and within 12" of every outlet box, junction box, cabinet or fitting [CEC 334.30].

### **C. CIRCUITS AND RECEPTACLES**

1. Tamper-Resistant Receptacles shall be installed as specified in dwelling units in all areas specified in 210.52. [CEC 406.12]
2. Receptacles shall be installed so that no point along the floor line in any wall space is more than 6 ft. from an outlet, including any wall space 2 ft. wide or greater. Note: A fixed panel of a sliding glass door is considered wall space. [CEC 210.52(A)].
3. In kitchens, breakfast rooms, pantries and dining rooms a minimum of 2-20A circuits shall be provided [CEC 210.11(C) (1)]. Counter space receptacles shall be GFCI [CEC 210.8(A)] and installed:
  - At each wall counter space that is 12 in. or greater [CEC 210.52(C)(1)] ;
  - No more than 48 in. oc. [CEC 210.52 (C)(1)];
  - Maximum 24 in. from the end of the counter [CEC 210.52 (C)(1)];
  - Maximum 20 in. above counter surface [CEC 210.52 (C)(5)];
  - On island counter spaces (one receptacle min.) not more than 12 in. below counter surface [CEC 210.52 (C)(5) Exception]. An island with less than 12" behind a range top of sink is considered as dividing the countertop into two separate spaces [CEC 210.52(C)(2)].
  - On peninsular counter spaces (one receptacle min.) not more than 12 in. below counter surface [CEC 210.52 (C)(5) Exception];
4. Bathrooms shall have a separate 20A circuit [CEC 210.11(C) (3)] with at least one GFCI wall receptacle within 36 in. of each basin [CEC 210.8(A)(1); CEC 210.52(D)].
5. Laundry rooms shall have a separate 20A circuit with at least one receptacle shall be provided [CEC 210.11(C)(2)]. All receptacles within 6 ft. of the sink shall be GFCI [CEC 210.8(A)(7)].
6. In garages, at least one GFCI receptacle shall be provided [CEC 210.52(G)]. All other garage receptacles except those dedicated to an appliance or that are not readily accessible shall be GFCI. [CEC 210.8(A)(2)].
7. In hallways of 10 ft. or more in length, at least one receptacle shall be provided [CEC 210.52(H)].
8. Outdoor outlets shall be GFCI [CEC 210.8(A) (3)]. One outlet shall be installed at the front of the dwelling and one at the rear of the dwelling. Receptacles shall be accessible at grade level and not more than 6-1/2 ft. above grade [CEC 210.52(E)].
9. All crawl space receptacles shall be GFCI [CEC 210.8(A)(4)].
10. All unfinished basement receptacles shall be GFCI unless they are not readily accessible or are service a dedicated appliance [CEC 210.8(A)(5)].
11. All receptacles within 6 ft. of a wet bar shall be GFCI [CEC 210.8(A)(7)].
12. All receptacles on 15A or 20A branch circuits that supply family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways or similar rooms or areas shall be protected by combination-type Arc-Fault Circuit Interrupters (AFCI), including switched outlets [CEC 210.12(A)].
13. All receptacles serving appliances or motors with a rating of 1 HP or 6 Amps shall be on a separate circuit.
14. For HVAC equipment, a separate 15A or 20A circuit with an accessible receptacle at the equipment shall be provided within 25 ft of the equipment [CEC 210.63]. If located in an under-floor area, the receptacle shall be GFCI [CEC 210.8(4)].
15. Basements, Garages and Accessory Buildings. For a one-family dwelling, at least one receptacle outlet shall be installed in the areas specified in 210.52(G)(1) through (3)/ These receptacles shall be in addition to receptacles required for specific equipment. [CEC210.52]

(1) Garages. In each attached garage and in each detached garage with electrical power. The branch circuit supplying this receptacle(s) shall not supply outlets outside of the garage. At least one receptacle outlet shall be installed for each car space.

(2) Accessory Buildings. In each accessory building with electric power.

(3) Basement. In each separate unfinished portion of a basement.

D. LIGHTING [CEC 210.70]

1. Switched lighting shall be installed in:

- All habitable rooms, Bathrooms, Hallways, and Stairways at each level,
- Garages,
- At all outdoor entrances and exits,
- In all attics, under floor areas, utility rooms and basements used for storage
- Near HVAC equipment in attic, under floor areas, rooms or basements, with a switch at the access point.

2. Lighting installed in a closet shall be a surface mounted or recessed fluorescent fixture or a surface mounted incandescent fixture with completely enclosed lamps or recessed incandescent fixture with completely enclosed lamps. Surface incandescent lighting shall be installed a minimum of 12 in. from the nearest point of a storage space. Surface fluorescent lighting and recessed lighting shall be installed a minimum of 6 in. from the nearest point of a storage space. [CEC 410.16(C)]

E. FANS

In bathrooms containing tubs or showers, a fan capable of exhausting 50 cfm shall be installed [Energy Standards 150(o)].

F. SMOKE ALARMS

In new construction, smoke alarms shall receive their primary power from the building wiring. The wiring shall be permanent and installed without a disconnecting switch other than those required for overcurrent protection [CRC R314.4].